

### Means for Solving the Problem

[0006] To achieve the above objects, the present invention is characterized in that a cooker is provided with: a heating chamber having an opening at the front face thereof, the heating chamber in which foods are placed; a door provided in the opening of the heating chamber; an external circulation path provided outside the heating chamber; a suction port that sucks in gas inside the heating chamber; a steam generating unit that generates steam by heating water, and releases the generated steam into the external circulation path; a blower provided in the external circulation path, the blower that makes the gas sucked in through the suction port return to the heating chamber by way of the steam generating unit; a heater that heats the steam generated by the steam generating unit so as to turn the steam into superheated steam; a blowhole through which the superheated steam heated by the heater blows out into the heating chamber; an exhaust port provided in the external circulation path, the exhaust port through which the gas sucked in through the suction port is exhausted to the outside; a damper that opens and closes the exhaust port; and a control unit that controls the damper so as to open/close the exhaust port in accordance with the movement of the door, and the suction port is provided in an innermost side wall of the heating chamber.

- ~~(a) a heating chamber in which foods are placed;~~
- ~~(b) an external circulation path provided outside the heating chamber;~~
- ~~(c) a blower that sucks in gas inside the heating chamber, and forms, in the external circulation path, a gas flow that makes the sucked gas return to the heating chamber;~~
- ~~(d) an exhaust port provided in the external circulation path and located downstream of the blower;~~
- ~~(e) a damper provided in the exhaust port; and~~

~~(f) a control unit that keeps the damper in a position of closing the exhaust port during cooking, and changes the damper to a position of opening the exhaust port in response to a sign that a door of the heating chamber is being opened.~~

[0007] With this structure, during cooking using high-temperature gas, the blower always produces a gas flow that is sucked into the external circulation path from the heating chamber and then returns to the heating chamber. When the door of the heating chamber is opened, the blower only changes the direction of the gas flow so as to make it flow through the exhaust port while continuously operating without stopping. This eliminates the problem of a time lag at start-up. Moreover, a gas flow circulating in the heating chamber and the external circulation path will be exhausted in due course of time. This eliminates a time lag that occurs when a gas flow changes its direction. This makes it possible to exhaust the high-temperature gas inside the heating chamber smoothly, and shorten the time before the opening of the door becomes possible.

[0008] Moreover, the present invention is characterized in that, in the cooker structured as described above, the blower is provided in an outer surface of the innermost side wall of the heating chamber and in the vicinity of the suction port, and the steam generating unit is disposed adjacently to the outer surface of the innermost side wall of the heating chamber. ~~after the damper is changed to a position of opening the exhaust port, the control unit continues to operate the blower until a predetermined condition is satisfied.~~

[0009] With this structure, principal components of the external circulation path, such as the suction port, the blower, and the steam generating unit, are concentrated in one side wall of the heating chamber, that is, an innermost side wall thereof, making the

length of the external circulation path shorter. This reduces the pressure loss in the external circulation path, enhancing gas supply efficiency of the external circulation path. Moreover, this also reduces a heat radiation area of the external circulation path, thereby reducing heat loss. As a result, a high degree of energy efficiency in circulating steam through the external circulation path is achieved. Furthermore, this eliminates the need for large space to dispose the external circulation path, making it possible to make the cabinet smaller. ~~—since the control unit continues to operate the blower until a predetermined condition is satisfied after the damper is changed to a position of opening the exhaust port, a gas flow flowing toward the back of the heating chamber away from the user is produced when the door of the heating chamber is opened so as to, for example, take out the foods, preventing high-temperature gas from blowing out thereof. This makes it possible to reliably ensure the safety after the door is opened.~~

[0010] Moreover, the present invention is characterized in that, in the cooker structured as described above, the damper selectively closes the external circulation path and the exhaust port. ~~—the predetermined condition is that a predetermined time period elapses after a sign that the door of the heating chamber is being opened is detected.~~

[0011] With this structure, since the damper selectively closes the external circulation path and the exhaust port, supply of gas to the heating chamber is stopped when high-temperature gas is exhausted from the heating chamber. This quickly reduces the pressure or amount of gas inside the heating chamber, making it possible to further shorten the time before the opening of the door becomes possible. ~~—since the predetermined condition is that a predetermined time period elapses after a sign that~~

~~the door of the heating chamber is being opened is detected, a gas flow flowing toward the back of the heating chamber away from the user is produced until a predetermined time period elapses after the door begins to open, preventing high temperature gas from blowing out thereof. This makes it possible to reliably ensure the safety after the door is opened.~~

[0012] Moreover, the present invention is characterized in that, in the cooker structured as described above, the damper closes the exhaust port during cooking, and opens the exhaust port when the door of the heating chamber is opened. ~~the predetermined condition is that it is determined that the door of the heating chamber is fully opened.~~

[0013] With this structure, since the predetermined condition is that it is determined that the door of the heating chamber is fully opened, a gas flow flowing toward the back of the heating chamber away from the user is produced when the door of the heating chamber is opened, for example, in order to take out the foods ~~until the door is fully opened after it begins to open, preventing high-temperature gas from blowing out thereof. This makes it possible to reliably ensure the safety after the door is opened.~~

[0014] Moreover, the present invention is characterized in that, in the cooker structured as described above, after the damper opens the exhaust port, the control unit continues to operate the blower until a predetermined time period elapses after a sign that the door is being opened is detected. ~~the predetermined condition is that a predetermined time period elapses after it is determined that the door of the heating chamber is fully opened.~~

[0015] With this structure, since the blower is continuously operated until a predetermined time period elapses after a sign that the door of the heating chamber is

~~being opened is detected, since the predetermined condition is that a predetermined time period elapses after it is determined that the door of the heating chamber is fully opened,~~ a gas flow flowing toward the back of the heating chamber away from the user is produced ~~until the door is fully opened after it begins to open, and until a predetermined time period elapses thereafter~~after the door begins to open, preventing high-temperature gas from blowing out thereof. This makes it possible to reliably ensure the safety after the door is opened.

[0016] Moreover, the present invention is characterized in that, in the cooker structured as described above, after the damper opens the exhaust port, the control unit continues to operate the blower until it is determined that the door is fully opened.  
~~the damper selectively closes the external circulation path and the exhaust port.~~

[0017] With this structure, since the blower is continuously operated until it is determined that the door of the heating chamber is fully opened, a gas flow flowing toward the back of the heating chamber away from the user is produced until the door is fully opened after it begins to open, preventing high-temperature gas from blowing out thereof. This makes it possible to reliably ensure the safety after the door is opened. ~~since the damper selectively closes the external circulation path and the exhaust port, supply of gas to the heating chamber is stopped when high-temperature gas is exhausted from the heating chamber. This quickly reduces the pressure or amount of gas inside the heating chamber, further shortening the time before the opening of the door becomes possible.~~

[0018] Moreover, the present invention is characterized in that, in the cooker structured as described above, after the damper opens the exhaust port, the control unit continues to operate the blower until a predetermined time period elapses after it is

determined that the door is fully opened. ~~there is provided a steam generation unit that feeds steam to gas passing through the external circulation path.~~

[0019] With this structure, since the blower is continuously operated until a predetermined time period elapses after it is determined that the door of the heating chamber is fully opened, a gas flow flowing toward the back of the heating chamber away from the user is produced until the door is fully opened after it begins to open, and until a predetermined time period elapses thereafter, preventing high-temperature gas from blowing out thereof. This makes it possible to reliably ensure the safety after the door is opened. ~~since the steam generation unit feeds steam to the gas passing through the external circulation path, it is possible to realize, in addition to cooking by the mere application of heat, cooking using steam to cook foods. This extends the range of cooking methods.~~

#### **Advantages of the Invention**

[0020] According to the present invention, cooking is performed by using a circulating gas flow of high-temperature gas that is sucked into an external circulation path from a heating chamber and then returns to the heating chamber. When a door of the heating chamber is opened, a blower that forms a circulating gas flow exhausts the high-temperature gas from an exhaust port without returning it to the heating chamber, whereby it is possible to exhaust the high-temperature gas from the heating chamber with the blower in operation. This shortens the time before the opening of the door becomes possible. Principal components of the external circulation path, such as the suction port, the blower, and the steam generating unit, are concentrated in one side wall of the heating chamber, that is, an innermost side wall thereof, making

the length of the external circulation path shorter. This reduces pressure loss of the external circulation path, enhancing gas supply efficiency thereof. Moreover, this also reduces a heat radiation area thereof, thereby reducing heat loss. As a result, a high degree of energy efficiency in circulating steam through the external circulation path is achieved. Moreover, by providing a damper that selectively closes the external circulation path and the exhaust port, it is possible to quickly reduce the pressure or amount of gas inside the heating chamber by stopping supply of gas to the heating chamber through the external circulation path when the high-temperature gas is exhausted by opening the exhaust port. This makes it possible to further shorten the time before the opening of the door becomes possible. Furthermore, by providing a steam generation unit that feeds steam to the gas passing through the external circulation path, it is possible to realize, in addition to cooking by the mere application of heat, cooking using steam to cook foods. This makes it possible to extend the range of cooking methods.

[0086] When the water supply pump 73 can not stop operating due to a breakdown of the water level sensor ~~switch~~ 68 or the water supply pump 73 or other causes, the water level in the pot 51 continues to rise beyond a predetermined level. When the water level reaches the highest point of the overflow pipe 67, the water sent from the water supply



## CLAIMS

[1](Amended)      A cooker comprising:

a heating chamber having an opening at a front face thereof, the heating chamber in which foods are placed;  
a door provided in the opening of the heating chamber;  
an external circulation path provided outside the heating chamber;  
a suction port that sucks in gas inside the heating chamber;  
a steam generating unit that generates steam by heating water, and releases the generated steam into the external circulation path;  
a blower provided in the external circulation path, the blower that makes the gas sucked in through the suction port return to the heating chamber by way of the steam generating unit;  
a heater that heats the steam generated by the steam generating unit so as to turn the steam into superheated steam;  
a blowhole through which the superheated steam heated by the heater blows out into the heating chamber;  
an exhaust port provided in the external circulation path, the exhaust port through which the gas sucked in through the suction port is exhausted to an outside;  
a damper that opens and closes the exhaust port; and  
a control unit that controls the damper so as to open/close the exhaust port in accordance with a movement of the door,  
wherein the suction port is provided in an innermost side wall of the heating chamber.

[2](Amended)      The cooker of claim 1,

wherein the blower is provided in an outer surface of the innermost side wall of the heating chamber and in a vicinity of the suction port, and the steam generating unit is disposed adjacently to the outer surface of the innermost side wall of the heating chamber.

[3](Amended)      The cooker of claim 1 or 2,

wherein the damper selectively closes the external circulation path and the exhaust port.

[4](Amended)      The cooker of claim 3,

wherein the damper closes the exhaust port during cooking, and opens the exhaust port when the door of the heating chamber is opened.

[5](Amended)      The cooker of claim 4,

wherein, after the damper opens the exhaust port, the control unit continues to operate the blower until a predetermined time period elapses after a sign that the door is being opened is detected.

[6](Amended)      The cooker of claim 4,

wherein, after the damper opens the exhaust port, the control unit continues to operate the blower until it is determined that the door is fully opened.

[7](Amended)      The cooker of claim 4,

wherein, after the damper opens the exhaust port, the control unit continues to operate

the blower until a predetermined time period elapses after it is determined that the door is  
fully opened.

FIG.1 AMENDED

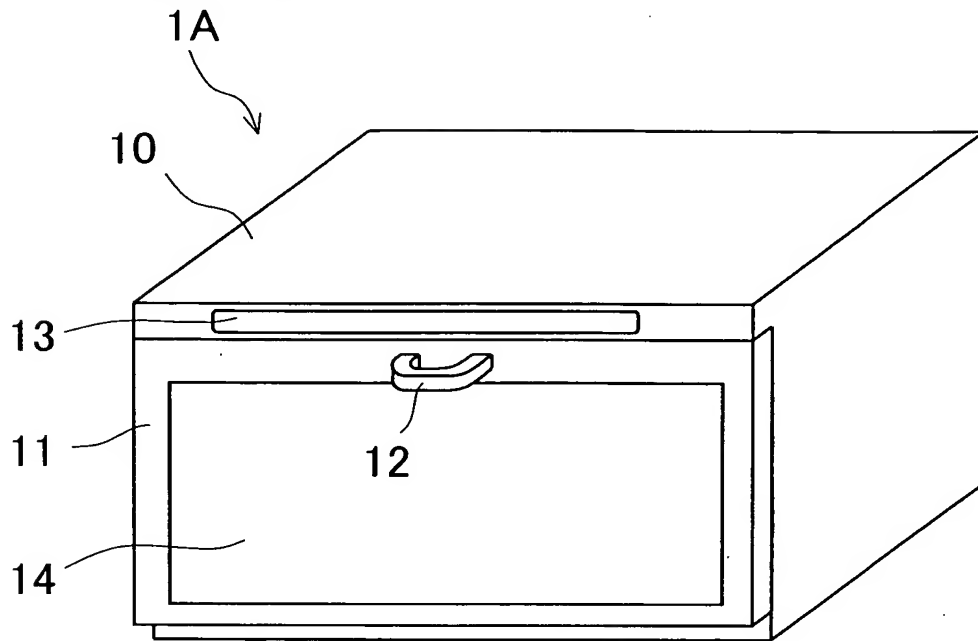


FIG.2 AMENDED

